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NASA/KSC GUIDE SPECIFICATIONS

References are in agreement with UMRL dated January 2009

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DIVISION 21 - FIRE SUPPRESSION

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DRY-CHEMICAL FIRE-EXTINGUISHING SYSTEMS

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NASA/KSC GUIDE SPECIFICATIONS

References are in agreement with UMRL dated January 2009
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SECTION 21 24 00.00 98

DRY-CHEMICAL FIRE-EXTINGUISHING SYSTEMS
10/07

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NOTE: This specification covers the requirements for halon fire detection equipment and control systems applicable to KSC and CCAFS.

Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable items(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments and suggestions on this guide specification are welcome and should be directed to the technical proponent of the specification. A listing of technical proponents, including their organization designation and telephone number, is on the Internet.
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PART 1 GENERAL

1.1 REFERENCES

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NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a RID outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text are automatically deleted from this section of the project

specification when you choose to reconcile references in the publish print process.

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The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 12A	(2008) Halon 1301 Fire Extinguishing Systems
NFPA 70	(2007; AMD 1 2008) National Electrical Code - 2008 Edition

1.2 SUBMITTALS

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NOTE: Review Submittal Description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project. Keep submittals to the minimum required for adequate quality control.

A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, use a code of up to three characters within the submittal tags following the "G" designation to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.

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Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are [for Contractor Quality Control approval.][for information only. When used, a designation following the "G" designation identifies the office that reviews the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Submit Fire-Alarm Specialist to the Contracting Officer.

SD-03 Product Data

Submit Manufacturer's catalog data for the following items:

Alarm Control Unit
Halon Remote Release Indicator (HRRI)
Manual Arm and Release Switches
Abort Switch

SD-06 Test Reports

Submit Test Procedures for Halon controls testing for approval 30 days prior to the start of functional test.

Submit Test Reports for Halon testing.

SD-08 Manufacturer's Instructions

Submit Posted Instructions for halon fire detection and control systems consisting of labels, signs, and templates of operating instructions that are required to be mounted or installed on or near the product for normal safe operation. reference numbers, warranty information, and fabrication site information.

1.3 GENERAL REQUIREMENTS

Section 26 05 00.00 40 COMMON WORK RESULTS FOR ELECTRICAL and Section 26 00 00.00 20 BASIC ELECTRICAL MATERIALS AND METHODS apply to work specified in this section.

Section 28 31 00.01 98 FIRE DETECTION AND ALARM (PROPRIETARY) applies to work specified in this section.

1.4 SYSTEM REQUIREMENTS

Halon fire-alarm system must be a cross-zoned, supervised, noncoded [_____], Style "D" and Style "7" solid-state electrical system including alarm-initiating devices, audible and visible alarm-indicating devices, arm and release solenoids, and control units electrically connected together to sound the general alarm continuously upon the operation of one or more alarm initiating devices. System must be approved for releasing device service.

Halon fire-alarm system must contain:

Alarm control unit

Halon remote release indicators

Manual arm switches on supervised Style "D" circuits

Manual release switches on supervised Style "D" circuits

Production-of-combustion detectors

Graphic display panel for detectors

Halon release and Halon early warning bells on supervised Style "7" circuits

Time limit cutout (TLC) for audible signals

Damper controls for air-handling and ventilating systems

Rotating beacons

Standby battery units integral with Halon control panel

Arm and release solenoids on supervised Style "7" circuits

All electrical switches, lights, and similar items that are integral parts of pressure switches, control panels, damper operators, etc., furnished and installed by the Contractor

Devices listed above must be as specified in Section 28 31 00.01 98 FIRE DETECTION AND ALARM (PROPRIETARY) if not otherwise specified in this Section.

1.4.1 Normal/Standby Sequence of Operation (KSC)

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NOTE: Select this paragraph for KSC projects.
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All switches must be in the normal position. Power lamp must be ON, the trouble lamp and detector identification lamps must be OFF.

a. With the mode-selector switch turned to the AUTOMATIC position, incorporate the following sequence of operation.

1. Activation of any one ionization detector must:

Light the detector identification lamp on the graphic display panel and the early warning lamp on the Halon control panel.

Light local rotating beacon(s) and, in the Halon control panel, turn on the early warning bell.

Activate Halon arming solenoid of the system involved and illuminate the HALON ARMED lamp on the Halon control panel and the Halon remote release indicators.

Transmit an alarm signal to the Central Station Fire Monitoring System. The local Halon system evacuation alarm bell(s) must not ring.

2. Activation of a MANUAL ARM switch or MANUAL RELEASE switch must result in the same operation as paragraph entitled, "Normal/Standby Sequence of Operation," subparagraph a.1 except no detector identification lamp lights.

3. After one detector has energized the arm solenoid, the activation of any detector in the other circuit in the same zone must:

Turn on all Halon system evacuation alarm bell(s) in the area of the Halon system involved.

Light the detector identification lamp on the graphic display panel and the FIRE lamp on the Halon control panel.

Energize Halon release solenoid of the system involved, discharge Halon into the protected area and illuminate the HALON RELEASE lamp on the Halon control panel, and the Halon remote release indicators.

Close dampers, release doors and shut off supply fans and airhandlers for the system involved.

Release of Halon into the distribution piping manifold must activate a manually reset pressure switch which illuminates the HALON REMOTE RELEASE INDICATORS located outside the protected area and the RELEASE COMPLETE lamp on the Halon control panel.

4. Activation of a MANUAL RELEASE switch after activation of a MANUAL ARM switch must result in the same operation as paragraph entitled, "Normal/Standby Sequence of Operation," subparagraph a.3 except no detector identification lamp lights.

5. Activation of a MANUAL RELEASE switch prior to activation of a MANUAL ARM switch must not dump Halon or close dampers. Activation of a MANUAL RELEASE switch followed by activation of a MANUAL ARM switch must result in the same operation as paragraph entitled, "Normal/Standby Sequence of Operation," subparagraph a.4.

b. With the mode selector turned to the MANUAL position, incorporate the following sequence of operation.

1. Activation of any one ionization detector must result in the same operation as with the mode selector switch in the AUTOMATIC POSITION except it must not activate the arming solenoid or light the HALON ARMED lamps.

After one detector has been activated, the activation of any detector in the other circuit of the same zone must result in the same operation as with the mode selector switch in the AUTOMATIC position except:

Halon release solenoid must not be activated, Halon must not be released, and associated indicators must not illuminate.

Dampers must not be closed and fans and air handlers must not shut down.

2. Activation of MANUAL ARM and MANUAL RELEASE switches with the mode selector turned to the MANUAL position must be the same as with the mode selector in the AUTOMATIC position.

1.4.2 Normal/Standby Sequence of Operation (CCAFS)

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NOTE: Select this paragraph for CCAFS projects.

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All switches must be in the normal position. Power lamp must be ON, the trouble lamp and detector identification lamps must be OFF.

a. Activation of any one ionization detector must:

Light the detector identification lamp on the graphic display paneland the early warning lamp on the Halon control panel.

Illuminate local rotating beacon(s) and, in the Halon control panel, turn on the early warning bell.

Activate Halon arming solenoid of the system involved and illuminate the HALON ARMED lamp on the Halon control panel and the Halon remote release indicators.

Transmit an alarm signal to the Central Station Fire Monitoring System through the Halon control panel code transmitter. The local Halon system evacuation alarm bell(s) must not ring.

b. After one detector has energized the arm solenoid, the activation of any detector in the other circuit in the same zone must:

1. Turn on the Halon system evacuation alarm bell(s) in the area of the Halon system involved.

2. Light the detector identification lamp on the graphic display panel and the HALON RELEASE lamps on the Halon control panel and the Halon remote release indicators.

3. Close dampers, and release doors shut off supply fans and air handlers for the system involved.

4. After a time delay adjustable from 0 to 180 seconds:

Energize the Halon release solenoid of the system involved. Discharge Halon into the protected area and light the HALON RELEASE lamp on the Halon control panel and the Halon remote release indicators. Transmit a Fire Alarm signal to the Central Station Fire Monitoring System.

5. Release of Halon into the distribution piping manifold must activate a manually reset pressure switch which illuminates the RELEASE COMPLETE lamp on the Halon control panel and the Halon remote release indicators.

6. Abort switches mounted on the Halon control panel and in the Halon remote release stations must:

Prevent release of Halon by the automatic detection system.

Report a trouble condition to the Central Station Fire Monitoring System.

Open dampers and effect restart of supply fans and AHU.

Sound the abort buzzer and light the abort lamp located on the Halon control panel and light the abort lamps on the Halon Remote Release Stations, when the system is in the abort mode.

Permit release of Halon upon operation of the manual arm and release switches in all abort switch positions which must shut down the supply fans and AHU and close dampers.

c. Activation of a MANUAL ARM switch or a MANUAL RELEASE switch must result in the same operation as paragraph entitled, "Normal/Standby Sequence of Operation (CCAFS)," subparagraph b except no detector identification lamp lights.

d. Activation of a MANUAL RELEASE switch after activation of a MANUAL ARM switch must result in the same operation as paragraph entitled, "Normal/Standby Sequence of Operation (CCAFS)," subparagraph b.1 thru b.5 except no detector identification lamp lights and there is no time delay on Halon discharge.

e. Activation of a MANUAL RELEASE switch prior to activation of a MANUAL ARM switch must not dump or close dampers. Activation of a MANUAL RELEASE switch followed by activation of a MANUAL ARM switch must result in the same operation as paragraph entitled, "Normal/Standby Sequence of Operation (CCAFS)," subparagraph d.

1.4.3 Trouble Condition

Operation must be in accordance with Section 28 31 00.01 98 FIRE DETECTION AND ALARM (PROPRIETARY). A pressure switch must sense the actuation-source pressure and illuminate a red lamp on the exterior of the control cabinet and the main Halon control panel face if the storage pressure drops to 80 percent of its original value.

1.5 SERVICES OF A FIRE-ALARM SPECIALIST

Provide services of a qualified specialist thoroughly experienced in the work to supervise the installation, make all necessary adjustments, and perform all tests on the Halon fire-alarm system at the site.

Specialist for this service must be one who can present evidence of at least five years' experience in system coordination and testing of the kind herein specified. All work must be done by or under the direct supervision of this specialist.

PART 2 PRODUCTS

2.1 EQUIPMENT STANDARDS

Fire-detection and -alarm equipment must conform to the applicable requirements of NFPA 12A, NFPA 70 (the NEC) and must be approved by Underwriters' Laboratories or Factory Mutual. Products must conform to the applicable portions of Section 28 31 00.01 98 FIRE DETECTION AND ALARM (PROPRIETARY).

2.2 ALARM-CONTROL UNIT

Alarm-control unit must be a fire alarm control panel as specified in Section 28 31 00.01 98 FIRE DETECTION AND ALARM (PROPRIETARY) with additional features, controls, and devices as required by the system sequence of operation, Section 28 31 00.01 98 FIRE DETECTION AND ALARM (PROPRIETARY).

Control unit must contain the following additional functions:

Mode Selector Switch - Automatic/Manual

Damper Reset Switch

Time Limit Cutout (Adjustable from 5 - 10 Minutes)

Early Warning Lamp

Halon Armed Lamp

Halon Release Lamp

Release Complete Lamp

Early Warning Bell

Abort Switch (CCAFS only)

Power ON-OFF switch must disconnect all power sources to the solenoids.

Damper reset switch must reset dampers to normal operating position after fire condition has been corrected.

Backup battery unit must be as specified in Section 28 31 00.01 98 FIRE DETECTION AND ALARM (PROPRIETARY) and in addition must be able to release Halon after 60 hours on battery power.

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NOTE: Select either of the following paragraphs, as applicable with project.
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2.3 HALON REMOTE RELEASE INDICATOR (HRRI)

2.3.1 HRRI For KSC

Halon Remote Release Indicator is a single red lens bullseye lamp mounted at entry into the halon protected area, as shown on the contract drawings. Mount a warning sign near the HRRI as shown on the contract drawings.

2.3.2 HRRI For CCAFS

Mount a 3-lamp bullseye annunciator at each entry into the Halon protected area, as shown on the contract drawings. Each HRRI must have the following lamps and nameplates from left to right:

Left - color - red lens

Legend - "HALON ARMED"

Center - color - red lens

Legend - "HALON RELEASE"

Right - color - blue lens

Legend - "HALON DISCHARGED"

Mount a warning sign near the HRRI as shown on the contract drawings.

2.4 MANUAL ARM AND RELEASE SWITCHES

Manual Arm and Release switches must be double-action enclosed toggle switches and must have a guard to prevent accidental operation. Guard must be held closed by a spring and have a plastic or lead seal tie that breaks when the guard is raised. Arm stations must be labeled "Halon Arm" and the release stations "Halon Release." Switches must be UL approved and 110 V ac/dc, 6 amp. The stations must be painted red with white lettering.

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NOTE: Use the following paragraph for halon systems at CCAFS.
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2.5 ABORT SWITCH

Abort switch must be a guarded momentary switch with a red activating light with action as required in this specification. Contact must be DPDT, 10 amp, 110 V ac/dc rated. A switch closure must lock up the abort circuit until the system has been reset.

PART 3 EXECUTION

3.1 INSTALLATION

All provisions of Section 28 31 00.01 98 FIRE DETECTION AND ALARM (PROPRIETARY) apply to work under this part. Submit Posted instructions for halon fire detection and control system.

3.1.1 Halon Fire Alarm and Detection Testing

Submit Test reports and test procedures.

This section covers testing of the Halon fire alarm and detection system portion of the Halon Fire Detection and Control System. Testing must be accomplished in accordance with the applicable portions of Section 28 31 00.01 98 FIRE DETECTION AND ALARM (PROPRIETARY).

3.1.2 Halon Controls Testing

All components except the discharge assembly on each tank and the pressure switches must be demonstrated, to the satisfaction on the Contracting Officer, to be functioning properly in relation to each other and in conjunction with the controls specified elsewhere. Run halon system functional test as integrated electrical and mechanical components. Discharge of the cylinders is not permitted for the functional testing.

-- End of Section --